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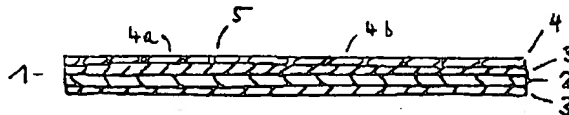
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<sup>54</sup> Adhesive Tape

<sup>57</sup> Adhesive tape for the roll change on the fly using a butt-splice in paper finishing machines, printing machines or the like, with a paper backing<sup>1</sup> and a water-soluble pressure-sensitive adhesive, characterized in that the paper backing (2) is coated on both sides with a water-soluble pressure-sensitive adhesive (3), and that the paper backing (2) consists of a tear-away<sup>2</sup> paper.



<sup>1</sup> or carrier

<sup>2</sup> literally paper capable of splitting or of delaminating; tear-away consistent with the terms used for tesa

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Description

Adhesive Tape

The invention concerns an adhesive tape for the roll change on the fly in paper finishing machines and the like.

In paper factories or the like, the roll change on the fly is a common process in order to replace an old, almost unwound roll of paper with a new one without having to stop the fast running machines. Double-sided self-adhesive tapes, so-called fasteners<sup>3</sup> are thereby used, which on one hand are highly sticky and tacky, but on the other hand, based on their water-soluble pressure-sensitive adhesive and paper backing, do not interfere when reusing the paper scraps in the papermaking machine. These fasteners are adhesively bonded in an elaborate way, having a jagged edge shape, to the start of the web, a procedure which requires experienced experts, where based on the rapidly running machines the time available for the entire operation is only about 4 -5 minutes.

Even though this technology is established and works out well, it has nevertheless a few disadvantages. Technical staff is thus necessary, hectic [activity] is a given, and the adhesive bonds are also relatively thick as the result is each time two layers of paper and the adhesive fastener lying in between: an undesirable result for the paper industry.

Various products, so-called fasteners, are available commercially for this "core starting"<sup>4</sup> during the roll change on the fly, which in addition to a paper backing have a water-soluble pressure-sensitive adhesive coated onto both sides. Such adhesive tapes are commercially available under the designation tesafix (Beiersdorf) among others.

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<sup>3</sup> the German term "Fixe" does not appear to be used very widely, and is also not used on the German *tesa* web-site. The term relates to fasteners or tabs and will be thus translated throughout this translation with *fastener*

<sup>4</sup> the literal translation is *tip bonding* or *leading end bonding*, but it could also refer to *splicing* in general; the *tesa* web-site has *Ansatzverklebung* = *splicing*, *Anfangsverklebung* = *core starting*; Spitze = *tip*, *leading end*, thus more likely to refer to the starting of a new roll

EP 418,527 A2 thus describes a process for preparing a roll of web-shaped imprintable material for automatic roll changing equipment and an adhesive strip suitable for this, subdivided into three zones. Of these, the central zone is non-adhesive, which in practice is of disadvantage in many respects, as in the case of the actual flying splice itself, where a jerky loading is the consequence, but also during the winding from such an adhesive strip into a roll and finally also during the mechanical affixing.

A process is known from DE 42 10 329 A1 for the bonding of successive paper webs wound into rolls, with appropriate adhesive strips. These are also segment-like structured in zones, cf. for instance the Figures 3 - 6.

The object of the invention was to bring remedy here, in particular make possible a thin adhesive joint during roll change on the fly, but simultaneously make possible for these reel changes [to be] jerkless and [to have available] more time, also more processing time, but without giving up on the advantages achieved up to now.

The means for attaining this object are as explained more closely in the claims.

In particular, the invention concerns an adhesive tape for the roll change on the fly using a butt-splice in paper finishing machines, printing machines or the like, with a paper backing and a water-soluble pressure-sensitive adhesive, characterized in that the paper backing (2) is coated on both sides with a water-soluble pressure-sensitive adhesive (3), and that the paper backing (2) consists of a tear-away paper.

An adhesive tape is thereby preferred, where one of the pressure-sensitive adhesives (3) has a cover<sup>5</sup> (4).

Furthermore preferred is an adhesive tape where the cover (4) is provided with a slit (5).

Furthermore preferred is an adhesive tape which is 120 to 150 mm wide, and measures 100 to 250, in particular 110 to 150  $\mu$ m over its entire width.

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<sup>5</sup> or release liner

Preferred is also an adhesive tape, where the slit (5) is provided at a distance of 20 - 40 mm from the edge of the adhesive tape (1).

Particularly preferred is furthermore an adhesive tape with a two -piece paper backing, as described in the subclaims.

The utilization of such adhesive tapes takes place in particular in a process of a roll change on the fly using a butt -splice in paper finishing machines, printing machines or the like, where an adhesive tape with paper backing and a water-soluble pressure-sensitive adhesive is used, characterized in that an adhesive tape according to the invention is used and partially backed to the upper most layer of a new roll of paper, and with its back side it is bonded adhesively to the paper web lying underneath and by that secures the upper most layer of paper, which after the new roll of paper is placed next to an almost entirely unwound old roll of paper to be replaced and accelerated to the same speed as that [old roll], then pushed against it and is thus cut off or knocked away], so that the exposed pressure-sensitive adhesive of the adhesive tape adhesively bonds [forming] a butt -splice] with the paper web of the old roll at essentially equal speeds of the paper webs, while simultaneously the easy-to-splice paper backing splices such that both pressure -sensitive adhesives which were coated onto it are covered non -adhesively by its loose ends.

This process is thereby preferred in such a way that only the smaller part is pulled at first from the slit cover and the adhesive tape is bonded adhesively with the exposed part of the pressure-sensitive adhesive behind the upper most layer of paper of a new paper roll, whereas the larger part of the cover is pulled off only shortly prior to the use for the roll change on the fly.

According to the invention, the paper industry is enabled to deviate from the previous process of the "core starting", but without giving up on its advantages.

Since for the automatic change of rolls in coating facilities it is desirable, for technical reasons and also for reasons of streamlining, to deviate from the known "core starting"

with double-sided reprocessa ble<sup>6</sup> adhesive tape (fastener). One can now switch over, with considerable advantages, to a single-sided adhesive reprocessa ble adhesive tape.

With this new adhesive bonding technology with an adhesive tape according to the invention one advantageously proceeds so that the upper most layer of paper (base paper) is adhesively bonded on the underside (diagonally to the direction of travel) with a covered single-sided reprocessa ble adhesive tape, approximately 120 mm wide. The underside bonding should be approx. 30 mm. The 30 mm perforated or slit cover paper is pulled off prior to the underside bonding. Following the removal of the release paper there are then about 90 mm remaining for the actual splicing proces s.

When the possibly present cover is removed, the single -sided adhesive tape, with the exposed side of the adhesive tape fac ing outwards, is now available for the actual splice.

When accelerating the roll of paper, it is necessary for the start of the paper (bonding area) to be fixed by means of a double -sided adhesive (reprocess a ble) tape, as is achieved according to the invention.

The advantages achieved according to the invention lie in particular in that the bonding area is considerably thinner than until now (thus fewer paper tears ), in that a jerkless splice is made possible, and in that there are fewer downtimes of the machines (increase in the efficiency), as a tear costs up to DM 30,000.--. The thickness of the bonding area is advantageously thin: currently: 2 layers of paper and adhesive tape tesafix (thickness of the adhesive tape 0.085 mm), but according to the invention, e.g., only 1 layer of paper and tesakrepp (thickness of th e adhesive tape 0.088 mm). Finally, the bonding area can be prepared outside of the coating equipment (rewinder). A reduction in personnel results through this at the coating equipment, as well as more time for executing the bonding area on the rewinder.

In the following, the invention shall be explained more closely by means of an example of embodiment, but without intending to unnecessarily restrict it . [The figures] show:

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<sup>6</sup> the intended meaning could be *repulpable*

Fig. 1 a schematic side view of an adhesive tape according to the invention,

Fig. 2 a schematic side view of an adhesive tape according to Fig. 1, adhesively bonded to a paper roll and, except for the release paper, ready for a roll change on the fly,

Fig. 3 a view according to Fig. 2, but following the roll change on the fly, and

Fig. 4 a schematic side view of a further preferred embodiment of an adhesive tape according to the invention.

Fig. 1 shows in detail an adhesive tape 1 with a backing (2) of creped paper, coated on both sides with a water-soluble pressure-sensitive adhesive (3). The total thickness of the backing (2) with both pressure-sensitive adhesives (3) is 0.140 mm, the width [is] 150 mm. The pressure-sensitive adhesive (3) is covered with a silicone-treated release paper (4), which at a distance of 30 mm from the left edge is provided with a slit (5), so that one can remove at first the left part of the release paper (4a), then the right part (4b). As pressure-sensitive adhesives (3) one uses layers of 50  $\mu\text{m}$  each of water-soluble acrylic adhesive, as available commercially as tesa 51915. As the tear-away paper backing one uses a 60  $\text{g/m}^2$  paper which splits centrally.

Represented in Fig. 2 is how such an adhesive tape (1) is bonded behind a paper web (11), and in particular with the left part after the release paper (4) had been removed from this part, whereas the exposed pressure-sensitive adhesive (3) bonded with the paper web (12) of a roll of paper lying underneath the paper web (11). The right part (4b) of the release paper (4) is then also removed, so that the roll of paper equipped in this way is ready for a roll change on the fly, whereby the bonding of the adhesive tape (1) runs diagonally over the roll so as to soften a jerk in the moment of the roll change on the fly.

The upper pressure-sensitive adhesive (3) lies now exposed and ready for this roll change on the fly using a butt-splice, with a width of 120 mm and over the entire width of the roll of paper.

The (new) roll of paper equipped in this way is brought next to the unwound (old) roll of paper to which the new one is to be set-up and accelerated to the same speed of

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rotation (arrow A) as that one. When this is achieved one may carry out the exchange: The new roll is lead up to the old one, according to Fig. 3 the pressure-sensitive adhesive (3) bonded to the paper web (13) of the old roll of paper, while the old roll is being knocked away (13a) and the easy-to-splice paper backing (2) splices such that a part (2a) remains behind on the paper web (11/13) and covers there the pressure-sensitive adhesive (3), while the other part (2b) remains behind on the paper web (12) and covers there, too, the pressure-sensitive adhesive 3. By that, both pressure-sensitive adhesives (3) are neutralized so to speak, are no longer adherent, and with that do also not interfere with the further process of the papermaking machines.

Represented in Fig. 4 is a further embodiment which is particularly suitable when higher tensile forces are to be withstood by the adhesive tape. A tear-away paper backing (2) is provided again, as described before, capable of splitting in the middle and of about  $60 \text{ g/m}^2$ , coated on both sides with the adhesives (3) and (3A) respectively, having a thickness of  $50 \text{ }\mu\text{m}$  on the exposed side (3) facing downwards, [and] a thickness of  $20 \text{ }\mu\text{m}$  facing upwards (3A) towards a further paper backing (2A), the material [being] as described above. A further tension-proof paper backing (2A), a tissue paper or a non-woven with a thickness of  $35$  and  $50 \text{ }\mu\text{m}$ , respectively, is laminated onto the adhesive (3A), and present on this [backing] there is another layer of adhesive (3),  $50 \text{ }\mu\text{m}$  in thickness, as described above, covered with a release paper (4a) and (4b).

These variants with tissue paper backings are particularly suitable for tensile forces of up to  $800 \text{ N/cm}$ , with non-woven backings up to  $1300 \text{ N/cm}$ .

## Claims

1. Adhesive tape for the roll change on the fly using a butt -splice in paper finishing machines, printing machines or the like, with a paper backing and a water-soluble pressure-sensitive adhesive, characterized in that the paper backing (2) is coated on both sides with a water-soluble pressure-sensitive adhesive (3), and that the paper backing (2) consists of a tear-away paper.

2. Adhesive tape according to claim 1, characterized in that one of the pressure - sensitive adhesives (3) has a cover (4).

3. Adhesive tape according to claim 2, characterized in that the cover (4) is provided with a slit (5).

4. Adhesive tape according to claim 1, characterized in that the adhesive tape (1) is 120 to 150 mm in width and that the paper backing (2) is made from a paper having a weight of 50 - 70 g/m<sup>2</sup>, in particular 60 g/m<sup>2</sup>.

5. Adhesive tape according to claim 1, characterized in that the paper backing (2) is made up of two parts, on one hand of a strain-bearing paper backing (2A) and on the other hand of a paper backing which corresponds to the paper backing (2) according to claim 1, whereby these two paper backings are bonded to one another through mechanical means or a water-soluble adhesive (3A).